US005844203A

United States Patent [19]

Chasen et al.

[11] **Patent Number: 5,844,203**

[45] **Date of Patent: Dec. 1, 1998**

[54] **COMBINED SWITCH ACTUATOR AND SIGNAL LIGHT TRANSMITTER FOR AN IRON**

[75] Inventors: **James E Chasen**, West Haven; **Peter A Czerner**, Trumbull, both of Conn.

[73] Assignee: **Black & Decker Inc.**, Newark, Del.

[21] Appl. No.: **539,933**

[22] Filed: **Oct. 6, 1995**

[51] **Int. Cl.**[6] **D06F 75/26**; H01H 9/00

[52] **U.S. Cl.** **219/256**; 38/74; 200/314

[58] **Field of Search** ..... 219/256, 257, 219/258–259, 245, 507; 38/74, 75, 79, 80, 81, 82, 93; 200/520, 523, 314, 345, 341, DIG. 47

[56] **References Cited**

U.S. PATENT DOCUMENTS

2,033,897	3/1936	Jenkins et al.	219/507
2,476,612	7/1949	Lobdell	219/507
4,022,993	5/1977	Shattuck	200/314
4,163,883	8/1979	Boulanger	200/314
4,203,101	5/1980	Townsend	340/635
4,347,428	8/1982	Conrad et al.	219/251
4,517,757	5/1985	Asada et al.	38/88
4,673,798	6/1987	Contri et al.	219/225
4,686,352	8/1987	Nawrot et al.	219/250
4,692,589	9/1987	Borsari et al.	219/251
4,743,736	5/1988	Albinger, Jr. et al.	219/250
4,885,443	12/1989	Simcoe et al.	200/314
5,250,139	10/1993	Hall	156/379
5,280,145	1/1994	Mosier et al.	200/314
5,285,037	2/1994	Baranski et al.	200/314
5,290,998	3/1994	Couch et al.	219/247
5,376,799	12/1994	Schamber et al.	250/441.11
5,545,865	8/1996	Gotou	200/341
5,568,367	10/1996	Park	200/314

FOREIGN PATENT DOCUMENTS

86759	8/1983	European Pat. Off. .	
63-43700	2/1988	Japan .	
1497310	7/1989	U.S.S.R.	38/82

OTHER PUBLICATIONS

1. Use and Care Book, "Advanced System Automatic Shut–Off Irons" For Models F630S, F615A, F612 and F610SA, Black & Decker, 1993, 16 pages.

Primary Examiner—Teresa J. Walberg
Assistant Examiner—Raphael Valencia
Attorney, Agent, or Firm—Barry E. Deutsch

[57] **ABSTRACT**

A switch actuator for an electric iron comprises a one-piece member with a first end stationarily connected to the housing of an iron and a second end adapted to be depressed by a user. The second end extends through an aperture in the housing. The second end is located in front of a control switch of the iron inside the housing. The second end has a transparent section to transmit light from a signal light inside of the housing to outside of the housing. The first end of the member is interlockingly captured by a receiving area of the housing without use of additional fasteners.

16 Claims, 3 Drawing Sheets

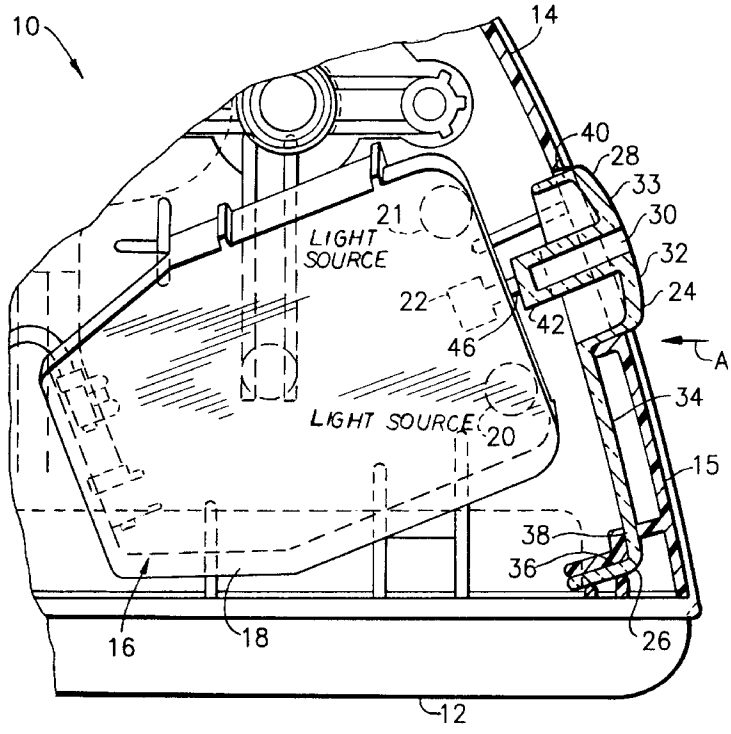


FIG. 1
PRIOR ART

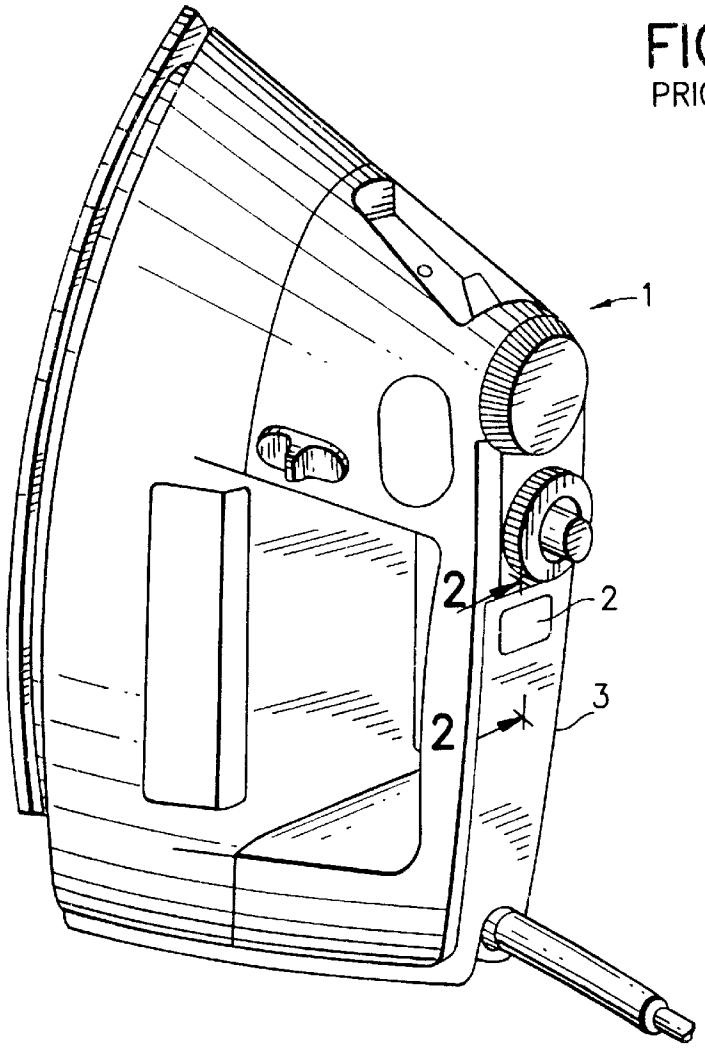


FIG. 2
PRIOR ART

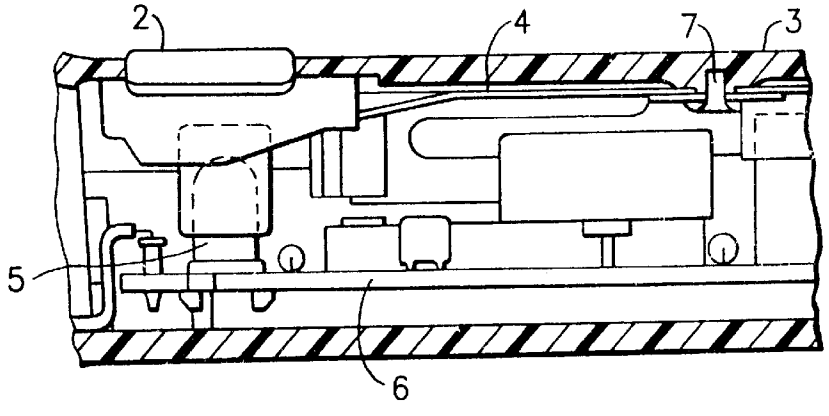


FIG. 3

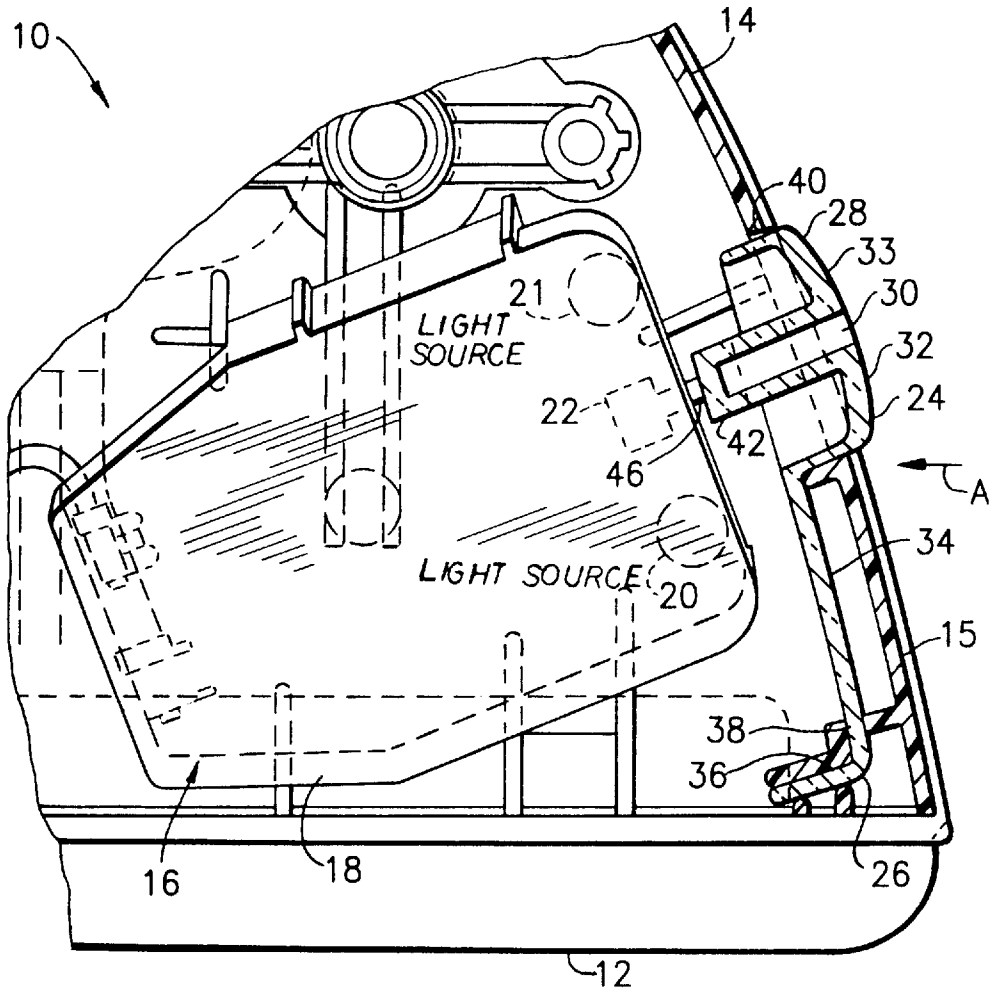
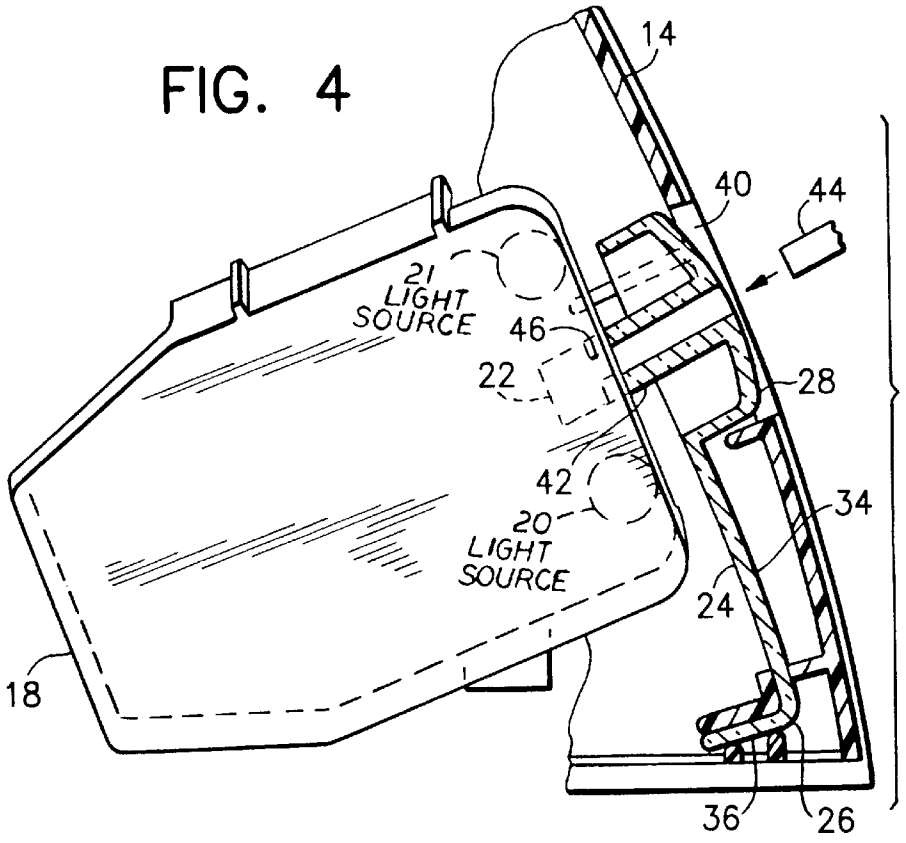

10
14
40
28
33
30
32
24
21
LIGHT SOURCE
22
42
46
A
34
LIGHT SOURCE
20
15
38
36
16
18
26
12

FIG. 4


14
40
44
21
LIGHT
SOURCE
46
22
28
42
34
20
LIGHT
SOURCE
24
18
36
26

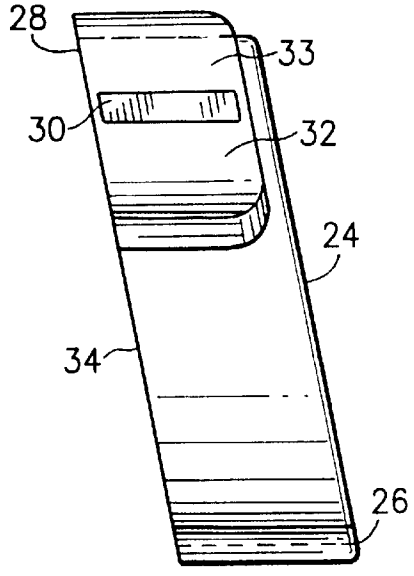

28
33
30
32
24
34
26

FIG. 5

COMBINED SWITCH ACTUATOR AND SIGNAL LIGHT TRANSMITTER FOR AN IRON

BACKGROUND OF THE INVENTION

1. Field of the Invention

The present invention relates to household appliances and, more particularly, to an iron with an improved actuator button.

2. Prior Art

U.S. Pat. No. 4,743,736 discloses an iron with two illuminated indicators and a separate start switch. U.S. Pat. No. 4,692,589 discloses an arm moved by a button to depress a reset pin. Black & Decker (U.S.) Inc. has sold irons under the model designations of an F600 series that has a Push On Button/Light on its handle. The Button/Light has a translucent push button member located over a light bulb and a metal leaf spring that biases the push button member at an undepressed position. Black & Decker (U.S.) Inc. has also sold irons under the model designation of an F800 series that has a stationary translucent window with a light bulb behind it at a side rear end of the iron and, a separate depressible button located below the window. The depressible button comprises a metal leaf spring and a plastic button member that is biased by the metal leaf spring at an undepressed position. Other U.S. patents that disclose irons with various switches or steam generators include the following:

U.S. Pat. No. 4,673,798 U.S. Pat. No. 4,686,352 U.S. Pat. No. 4,203,101 U.S. Pat. No. 4,347,428 U.S. Pat. No. 4,517,757 U.S. Pat. No. 5,250,139 U.S. Pat. No. 5,290,998 U.S. Pat. No. 5,376,799

SUMMARY OF THE INVENTION

In accordance with one embodiment of the present invention, in an iron having a soleplate, a housing connected to the soleplate, and a control switch located inside the housing, the improvement comprises a one piece actuator having a first end stationarily connected to the housing and a second movable end extending through an aperture in the housing and located in front of the control switch to actuate the control switch when the second end is depressed.

In accordance with another embodiment of the present invention, in an iron having a soleplate, a housing connected to the soleplate, and control circuitry located inside the housing, the improvement comprises an actuator located inside and connected to the housing, the actuator having a button section extending through an aperture in the housing for depression by a user, the button section being suitably located to actuate a switch of the control circuitry when the button section is depressed by the user, the button section having a light transmitting section located in a path of a signal light of the control circuitry.

In accordance with another embodiment of the present invention, in an iron having a soleplate, a housing connected to the soleplate, and control circuitry located inside the housing, the improvement comprises a combined switch actuator and signal light transmitting member connected to the housing. The member is depressed by a user to actuate a switch of the control circuitry and transmits light from a signal light of the control circuitry to outside the housing.

BRIEF DESCRIPTION OF THE DRAWINGS

The foregoing aspects and other features of the invention are explained in the following description, taken in connection with the accompanying drawings, wherein:

FIG. **1** is a perspective view of an iron known in the prior art;

FIG. **2** is a cross-sectional view of the handle of the iron shown in FIG. **1** taken along line **2**—**2**;

FIG. **3** is a partial schematic cross-sectional view of a portion of an iron incorporating features of the present invention at a rear end of the iron;

FIG. **4** is a partial schematic cross-sectional view of some of the components shown in FIG. **3** with the actuator moved to a depressed position; and

FIG. **5** is an elevational side view of the actuator shown in FIG. **3** taken from direction A.

DETAILED DESCRIPTION OF THE PREFERRED EMBODIMENT

FIGS. **1** and **2** show an iron **1** known in the prior art that has a depressible button **2** on its handle **3**. The button **2** is biased by a metal leaf spring **4** towards its undepressed position. The button **2** is made of plastic translucent material. Two light bulbs **5** (only one of which is shown) connected to a circuit board **6** are located under the button **2**. The leaf spring is fastened to the handle **3** by a fastener **7**.

Referring to FIG. **3**, there is shown a partial schematic cross-sectional view of a portion of an iron **10** incorporating features of the present invention. Although the present invention will be described with reference to the single embodiment shown in the drawings, it should be understood that the present invention may be embodied in various different forms of alternate embodiments. In addition, any suitable size, shape or type of elements or materials could be used.

The iron **10** includes a soleplate **12**, a housing **14** and control circuitry **16**. The housing **14** is attached to the soleplate **12** and encloses the control circuitry **16**. The control circuitry **16** includes an automatic off module **18**. In the embodiment shown, the module **18** is a time controlled module that turns the iron off after a predetermined or preset period of time, such as one hour after the iron is turned on. However, the module could have any suitable type of control circuitry. The module **18** includes light sources **20**, **21**, such as neon bulbs, and a switch **22**. One of the two light sources **21** is provided to signal that electrical power is being supplied to the iron. The other light source **20** is provided to signal that the thermostat is being supplied with electricity for powering the heating element (not shown). In an alternate embodiment only one of the light sources need be provided to signal that the power is on. In another alternate embodiment, more than two light sources could be provided. The switch **22** is provided to reset the module **18** after the automatic off feature has been activated.

Referring also to FIG. **5**, an actuator **24** of the iron **10** is shown. The actuator **24** is preferably comprised of a transparent plastic or polymer material. The actuator **24** has a first end **26** and a second end **28**. The first end **26** has a general "L" shape. The second end **28** forms a push button section for the actuator. The second end **28** has a pocket **30** and two light transmitting areas **32**, **33** located at the bottom and the top of the pocket **30**. In an alternate embodiment, the pocket **30** need not be provided. In another alternate embodiment, more or less than two light transmitting areas could be provided. The rear of the pocket **30** forms a projection **42** at the back of the second end **28**. Located between the two ends **26**, **28** is an elongate center section **34**. The center section **34** is deformable in a general cantilever fashion along its length.

As seen in FIG. **3**, the housing **14** includes a receiving area **36** and a slot **38**. The receiving area **36** is suitably sized

and shaped to have the first end **26** of the actuator **24** stationarily located therein. The first end **26** extends out of the receiving area **36** through the slot **38**. In the embodiment shown, the receiving area **36** and slot **38** are formed in the rear end cover **15** of the housing **14**. However, the receiving area and slot could be formed in another area of the housing; not necessarily in the rear end cover **15**. In order to insert the first end **26** into the receiving area **36**, the actuator **24** is positioned inside the rear end cover **15** before connection of the cover to the rest of the housing. The first end **26** slides into the receiving area **36** and the rear end cover **15** is then connected to the rest of the housing to complete the capture of the first end **26** in the area **36**. When the rear end cover **15** is attached to the rest of the housing, the entrances to the area **36** and slot **38** are blocked by a skirt of the iron. Thus, the first end **26** is interlockingly stationarily connected to the housing without direct use of fasteners between the actuator and the housing. The rear end cover **15** also has a side aperture **40** at its front end. The side aperture **40** is suitably sized and shaped to receive the second end **28** of the actuator **24**. More specifically, the outer side of the second end **28** projects out of the housing at the aperture **40** in its unactuated position shown in FIG. **3**. As seen in FIG. **5**, the actuator **24** has a general angled shape relative to the first end **26**. This is because the rear end of the housing **14**, where the rear end cover is attached, has an angled shape.

As noted above, the module **18** has two lights **20**, **21**. The lights **20**, **21** are located on opposite sides of the switch **22**; one above and one below. The lower light transmitting area **32** on the actuator's second end **28** is located in a path of light from the lower light source **20** to transmit that light outside of the housing **14**. The upper light transmitting area **33** is located in a path of light from the upper light source **21** to transmit that light outside of the housing **14**. The light transmitting areas **32**, **33** can function as a lens because the actuator **24** is comprised of transparent material. In an alternate embodiment, the actuator could be comprised of translucent material, or the areas **32**, **33** could be separate transparent or translucent members that are fixedly connected to the rest of the actuator. The pocket **30** has been provided in order to receive an insert **44** (see FIG. **4**) therein. The insert **44** is preferably an opaque member. The insert **44** insures that light from the two light sources **20**, **21** is kept separate at the two light transmitting areas **32**, **33**. The insert is preferably permanently fixed to the actuator **24**, such as by ultrasonic welding or snap-lock attachment. Alternatively, the insert need not be provided. The inside of the pocket **30** could be coated with a light blocking coating to prevent light at area **32** from traveling to area **33** or visa versa. There may be some cross-over or bleed through of light to the wrong area **32**, **33**, but such cross-over or bleed through is limited. Alternatively, any suitable means could be used to insure that the two areas **32**, **33** each respectively transmit light from only one of the light sources **20**, **21**.

Referring also to FIG. **4**, the module **18**, housing **14** and actuator **24** are shown with the actuator **24** in an actuated or depressed position. In order to actuate the actuator **24**, a user merely depresses the second end **28** further into the housing **14**. The projection **42**, in the unactuated position shown in FIG. **3**, is located on or very close to an end of a switch button **46** of the switch **22**. When the second end **28** of the actuator **24** is depressed, as shown in FIG. **4**, the projection **42** depresses the switch button **46** to thereby actuate the switch **22**. Because the first end **26** of the actuator **24** is interlockingly stationarily captured in the receiving area **36**, the center section **34** of the actuator **24** deflects in a general cantilever fashion. Because the actuator **24** is made of a resilient deflectable material, when the user releases the second end **28**, the actuator **24** springs back to its position shown in FIG. **3**. In a preferred embodiment the actuator **24** proximate the second end **28** can be preloaded against the inside of the housing **14**. When the switch **22** is actuated by the actuator **24**, the module **18** is reset to allow the iron to function again. Thus, the switch **22** merely resets the automatic off module **18**. In an alternate embodiment, the switch **22** could also control the ON/OFF feature of the iron irrespective of whether the automatic off feature of the module **18** caused the iron to automatically turn OFF.

In alternate embodiments, the actuator could have any suitable shape. However, the one-piece nature of the actuator **24** in combination with the integral light transmitting areas **32**, **33** is a preferred embodiment. Any suitable means could be used to connect the actuator **24** to the housing **14**. However, the interlocking stationary connection of the first end **26** in the receiving area **36** without the use of additional fasteners is also a preferred embodiment. The switch **22** could also have any suitable switch button or lever to be actuated by the back of the second end **28** of the actuator **24**.

It should be understood that the foregoing description is only illustrative of the invention. Various alternatives and modifications can be devised by those skilled in the art without departing from the spirit of the invention. Accordingly, the present invention is intended to embrace all such alternatives, modifications and variances which fall within the scope of the appended claims.

What is claimed is:

1. In an iron having a soleplate, a housing connected to the soleplate, and a control switch located inside the housing, the improvement comprising:

a one-piece actuator having a first end stationarily connected to the housing and a second movable end extending through an aperture in the housing and located in front of the control switch to actuate the control switch when the second end is depressed, said second end forming a light transmitting section; and

an independent source of light mounted in said housing in general axial alignment with the second end of said actuator and axially spaced from said actuator, said second end of said actuator transmitting light from inside said housing to outside the housing.

2. An iron in claim **1** wherein the light transmitting section is transparent.

3. An iron as in claim **1** wherein the light transmitting section comprises a lens.

4. An iron as in claim **1** wherein the first end is interlockingly connected to the housing in a receiving area of the housing without use of additional fasteners.

5. In an iron having a soleplate, a housing connected to the soleplate, and control circuitry located inside the housing, the improvement comprising:

a one-piece actuator located inside and connected to the housing, the actuator having a button section extending through an aperture in the housing for depression by a user and means for biasing the button section at an undepressed position, the button section being suitably located to actuate a switch of the control circuitry when the button section is depressed by the user, the button section having a light transmitting section located in a path of a signal light of the control circuitry; and

an independent source for the signal light mounted in said housing in general axial alignment with the button section of said actuator and axially spaced from said actuator, said button section of said actuator transmitting light from inside said housing to outside the housing.

6. An iron as in claim **5** wherein the actuator has a first end stationarily connected to the housing, the actuator deflecting in a general cantilevered fashion when the user depresses the button section.

7. An iron as in claim **6** wherein the first end is interlockingly connected to the housing in a receiving area of the housing without use of additional fasteners.

8. An iron as in claim **5** wherein the light transmitting section is transparent.

9. An iron as in claim **5** wherein the light transmitting section comprises a lens.

10. In an iron having a soleplate, a housing connected to the soleplate, and control circuitry located inside the housing, the improvement comprising:

a combined switch actuator and signal light transmitting member connected to the housing, the member being depressed by a user to actuate a switch of the control circuitry and transmitting light from a signal light of the control circuitry to outside the housing; and

an independent source of light mounted in said housing and axially spaced from said combined switch actuator and light transmitting member, said source of light including at least two separate light transmitting sources and said light transmitting member including at least two light transmitting sections and a pocket separating said light transmitting sections, a portion of said pocket being opaque.

11. An iron as in claim **10** further comprising an opaque insert located in the pocket.

12. An iron as in claim **10** wherein the member is a one-piece member.

13. An iron as in claim **12** wherein the member has a first end stationarily connected to the housing, the member deflecting in a general cantilevered fashion when the user depresses a button section of the member.

14. An iron as in claim **13** wherein the first end is interlockingly connected to the housing in a receiving area of the housing without use of additional fasteners.

15. An iron as in claim **10** wherein the light transmitting section is transparent.

16. An iron as in claim **10** wherein the light transmitting section comprises a lens.

* * * * *